



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/844,581	04/26/2001	Carl A. Waldspurger	Vmware11	1803

7590 07/14/2006

JEFFREY PEARCE  
3145 PORTER DRIVE  
PALO ALTO, CA 94304

EXAMINER

TO, JENNIFER N

ART UNIT	PAPER NUMBER
----------	--------------

2195

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/844,581	<b>Applicant(s)</b> WALDSPURGER ET AL.	
	<b>Examiner</b> Jennifer N. To	<b>Art Unit</b> 2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

1. Claims 1-32 are pending for examination.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 9-11, and 25-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cota-Robles et al. (hereafter Cota-Robles) (U.S. Publication No. 2002/0143842).

4. Cota-Robles was cited in the previous office action.

5. As per claim 1, Cota-Robles teaches the invention substantially as claimed including a method for controlling input/output (I/O) operations of a user's computer comprising the following step:

implementing the user's computer a virtual machine (VM) (paragraphs [0019-0020]);

including an interface software component between the VM and a physical computer system that includes at least one device (paragraphs [0019]-[0020]);

in the interface software component:

sensing a request for an I/O operation between the VM and the device (paragraphs [0027], [0029], [0042], [0047]);

performing a transformation of I/O data passing between the VM and the device (paragraphs [0015], [0027], [0047]);

the transformation of the I/O data thereby being undefeatable by any user action via the VM (paragraphs [0025], [0027], [0029], [0047]).

6. With respect to the limitation of said transforming being adjunct to necessary completion of the request as issued for the I/O operation, Cota-Robles disclosed that there are to be "zero or more" transformations, which implies that the transformations may be wholly unnecessary (paragraph [0027]). Therefore it would have been obvious to one of an ordinary skill in the art that Cota-Robles suggests transformation may not be necessary (adjunct, optional, or not required) for proper completion of the input/output operations.

7. As per claim 2, Cota-Robles teaches:

the device is a display (paragraph [0015]);

the I/O data is VM display data output from the VM and intended for display (paragraphs [0015], [0027], [0029], [0042], [0047]); and

the transformation is a replacement of at least a portion of the VM display data with non defeatable display data stored external to the VM (paragraphs [0015], [0027], [0047]);

further including the step of displaying the VM display data with the non-defeatable display data overlaid (paragraphs [0015], [0025], [0027], [0029], [0047]).

8. As per claim 3, Cota-Robles further teaches:

filtering the I/O data with respect to at least one predetermined filtering condition (paragraphs [0027], [0029], [0042], [0047]);

performing the transformation of the I/O data only when the filtering condition is met (paragraphs [0027], [0029], [0042], [0047]).

9. As per claim 9, Cota-Robles teaches the transformation comprises insertion into the I/O data of a source indication associated with the VM (paragraphs [0027], [0029], [0042], [0047]).

10. As per claim 10, Cota-Robles teaches the transformation is time-varying (paragraphs [0015], [0023]).

11. As per claim 11, Cota-Robles teaches the device is a network connection device (paragraphs [0015], [0023]).

12. As per claim 25, Cota-Robles teaches:

the VM supports a plurality of I/O modes (paragraphs [0015], [0023]);

the step of filtering is performed on I/O data corresponding to a first one of the plurality of I/O modes (paragraphs [0027], [0029], [0042], [0047]); and

the transformation is applied to I/O data in a second one of the I/O modes when the I/O data in the first mode satisfies a transformation-triggering criterion (paragraphs [0015], [0027], [0029], [0042], [0047]).

13. As per claim 26, Cota-Robles teaches the I/O modes include a video mode and an audio mode (paragraphs [0015], [0023]).

14. As per claims 27-28, it is rejected for the same reason as claim 1 above.

15. As per claim 29, Cota-Robles teaches the device is a display and the I/O data is VM display data (paragraph [0015]).

16. As per claim 30, Cota-Robles further teaches:

a display buffer within the VMM for storing the VM display data that is output from the VM and is intended for display (paragraphs [0015], [0027], [0042], [0047]);

a transformation software module comprising computer-executable code within the interface software component for replacing at least a portion of the VM display data stored in the display buffer with non-defeatable display data (paragraphs [0015], [0027], [0042], [0047]); and

in which the display is provided for displaying the contents of the display buffer (paragraphs [0015], [0023], [0027], [0042], [0047]).

17. As per claim 31, Cota-Robles teaches the device is a data storage device (paragraphs [0015], [0023]).

18. As per claim 32, Cota-Robles teaches the device is a network connection device (paragraphs [0015], [0023]).

19. Claims 4-5, 8, and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cota-Robles et al. (hereafter Cota-Robles) (U.S. Publication No. 2002/0143842), as applied in claim 1 above, and in view of O'Neil et al. (hereafter O'Neil) (U.S. Patent No. 5987440).

20. O'Neil was cited in the previous office action.

21. As per claim 4, Cota-Robles teaches the invention substantially as claimed in claim 1. Cota-Robles did not specifically teach the filtering condition is that the I/O data includes at least one restricted term.

22. However, O'Neil teaches the filtering condition is that the I/O data includes at least one restricted term (abstract; col. 56, lines 5-40; col. 57, line 60 through col. 58 line 63).

23. It would have been obvious to one of an ordinary skill in the art at the time the invention was made to have combined the teaching of Cota-Robles and O'Neil since Cota-Robles, while presenting a method of representing a processing device in a virtual machine to control input and output, does not present specific types of input/output devices, or how certain features therein would be implanted. Modern computing is embodied within a networked environment to point where it is nearly commonplace. With this advent in computing, protecting the integrity of data is of utmost importance. O'Neil provides a method of protecting information security within a virtual private network, or other type of network, such that personal data or other sensitive data can be trusted and more securely transferred.

24. As per claim 5, O'Neil teaches the filtering condition is that the I/O data is from a restricted source (abstract; col. 56, lines 5-40; col. 57, line 60 through col. 58 line 63).

25. As per claim 8, O'Neil teaches the filtering condition is the presence in the I/O data of a copy protection indication (abstract; col. 56, lines 5-40; col. 57, line 60 through col. 58 line 63).

26. As per claim 21, O'neil teaches:

the device is a network connection device (abstract; col. 56, lines 5-40; col. 57, line 60 through col. 58 line 63);

the requested I/O operation is a transfer of data between the VM and the network connection device (abstract; col. 56, lines 5-40; col. 57, line 60 through col. 58 line 63);  
and

the step of performing the transformation comprises changing at least a portion of the data during the transfer between the VM and the network connection device (abstract; col. 56, lines 5-40; col. 57, line 60 through col. 58 line 63).

27. As per claim 22, O'Neil teaches the step of performing the transformation of the I/O data comprises encrypting data written by the VM to the network connection device and decrypting data read from the network connection device by the VM (abstract; col. 56, lines 5-40; col. 57, line 60 through col. 58 line 63).

28. As per claim 23, O'neil teaches the step of performing the transformation of the I/O data comprises compressing data written by the VM to the network connection device and decompressing data read from the network connection device by the VM (abstract; col. 56, lines 5-40; col. 57, line 60 through col. 58 line 63).

29. As per claim 24, O'Neil teaches the step of performing the transformation of the I/O data comprises cryptographic transformation of the I/O data (abstract; col. 56, lines 5-40; col. 57, line 60 through col. 58 line 63).

30. Claims 6-7, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cota-Robles et al. (hereafter Cota-Robles) (U.S. Publication No. 2002/0143842), as applied in claim 1 above, and in view of Pasieka (U.S. Patent No. 6587945).

31. Pasieka was cited in the previous office action.

32. As per claim 6, Cota-Robles teaches the invention substantially as claimed in claims 1, and 3 above. Cota-Robles did not specifically teach:

the I/O data includes image data;

the step of filtering the I/O data comprises detecting the presence of a representation of a target within the image data; and

the transformation is substitution of a representation of a replacement image in place of the representation of the target image.

33. However, Pasieka teaches:

the I/O data includes image data (col. 4, line 58 through col. 5, line 17);

the step of filtering the I/O data comprises detecting the presence of a representation of a target within the image data (col. 4, line 58 through col. 5, line 17);  
and

the transformation is substitution of a representation of a replacement image in place of the representation of the target image (col. 4, line 58 through col. 5, line 17).

34. It would have been obvious to one of an ordinary skill in the art at the time the invention was made to have combined the teaching of Cota-Robles and Pasieka since Cota-Robles, while presenting a method of representing a processing device in a virtual machine to control input and output, does not present specific types of input/output devices, or how a certain features therein would be implemented. In the systems that utilize virtual machines, Internet applications or other network computing is very common. Along with this type of processing comes a transfer of image data or other display data. While Cota-Robles mentions this type of input/output briefly, it does not specifically address how the transmission of these images would be protected. Pasieka provides such a method of digitally signing an image before it is transferred such that the origin and integrity of a document or image can be verified before it is displayed on a user's screen.

35. As per claim 7, Pasieka teaches:

the I/O data is in a non-character image format (col. 4, line 58 through col. 5, line 17);

the target image is a representation of a restricted character string (col. 4, line 58 through col. 5, line 17); and

the step of filtering the I/O data comprises applying character recognition to the I/O data (col. 4, line 58 through col. 5, line 17).

36. As per claim 15, Pasieka teaches:

the device is a display (col. 4, line 58 through col. 5, line 17);

the display renders data stored in a display map (col. 4, line 58 through col. 5, line 17); and

the step of performing the transformation comprises altering a selected portion of the display map (col. 4, line 58 through col. 5, line 17).

37. As per claim 16, Paseika teaches the step of altering the selected portion of the display data comprises substituting non-defeatable display data for the selected portion (col. 4, line 58 through col. 5, line 17).

38. As per claim 17, Paseika teaches the step of altering the selected portion of the display data comprises changing all occurrences in the display map of a display color to a replacement color (col. 6, lines 15-54).

39. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cota-Robles et al. (hereafter Cota-Robles) (U.S. Publication No. 2002/0143842), as

applied in claim 1 above, and in view of Narlikar et al. (hereafter Narlikar) (U.S. Publication No. 2002/0069241).

40. Narlikar was cited in the previous office action.

41. As per claim 12, Cota-Robles teaches the invention substantially as claimed in claims 1, and 11. Cota-Robles did not specifically teach the transformation is a bandwidth limiting of the I/O data being transferred between the VM and the network connection device.

42. However, Narlikar teaches the transformation is a bandwidth limiting of the I/O data being transferred between the VM and the network connection device (abstract, paragraphs [0003]-[0005], [0012], [0019]).

43. It would have been obvious to one of an ordinary skill in the art at the time the invention was made to have combined the teaching of Cota-Robles and Narlikar since in a networked computing environment, processing bottlenecks can lead to loss of data, inconsistent processing, or other failures. This particular type of input/output processing must be accounted for in a network environment. Often, such that one node does not handle an excessive amount of requests. Narlikar provides such a proxy server, which determines the best way to distribute that request. Thus, processing throughput can be improved giving rise to more reliable and efficient processing.

44. As per claim 13, Narlikar teaches:

the requested I/O operation is transfer of the I/O data between the VM and the network connection device (abstract, paragraphs [0003]-[0005], [0012], [0019]); and the transformation in a time delay of the transfer (abstract, paragraphs [0003]-[0005], [0012], [0019]).

45. As per claim 14, Narlikar teaches:

the requested I/O operation is transfer of the I/O data from the VM to a first destination address via the network connection device (abstract, paragraphs [0003]-[0005], [0012], [0019]); and

the transformation is a redirection of the I/O data to a second destination address different from the first (abstract, paragraphs [0003]-[0005], [0012], [0019]).

46. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cota-Robles et al. (hereafter Cota-Robles) (U.S. Publication No. 2002/0143842), as applied in claim 1 above, and in view of Samar (U.S. Publication No. 2002/0078049).

47. Samar was cited in the previous office action.

48. As per claim 18, Cota-Robles teaches the invention substantially as claimed in claim 1. Cota-Robles did not specifically teach:

the device is a data storage device;

the requested I/O operation is a transfer of data between the VM and the storage device; and

the step of performing the transformation comprises changing at least a portion of the data during the transfer between the VM and the storage device.

49. However, Samar teaches:

the device is a data storage device (abstract; paragraphs [0029], [0030], [0040], [0041]);

the requested I/O operation is a transfer of data between the VM and the storage device (abstract; paragraphs [0029], [0030], [0040], [0041]); and

the step of performing the transformation comprises changing at least a portion of the data during the transfer between the VM and the storage device (abstract; paragraphs [0029], [0030], [0040], [0041]).

50. It would have been obvious to one of an ordinary skill in the art at the time the invention was made to have combined the teaching of Cota-Robles and Samar since Cota-Robles, while presenting a method of representing a processing device in a virtual machine to control input and output, does not present specific types of input/output devices, or how certain features therein would be implemented. Modern computing utilizes data stores and databases to store sensitive data. With this advent in computing, protecting the integrity of the data is utmost importance. Samar provides a

method of determining if data that is to be stored is of a sensitive nature, and if so, encrypting the data such that it can be protected against unauthorized access.

51. As per claim 19, Samar teaches the step of performing the transformation of the I/O data comprises encrypting data written by the VM to the data storage device and decrypting data read from the data storage device by the VM (abstract; paragraphs [0029], [0030], [0040], [0041]).

52. As per claim 20, Samar teaches the step of performing the transformation of the I/O data comprises compressing data written by the VM to the data storage device and decompressing data read from the data storage device by the VM (abstract; paragraphs [0029], [0030], [0040], [0041]).

### ***Response to Arguments***

53. Applicant's arguments filed 04/24/2006 have been fully considered but they are not persuasive.

54. In the remark applicant argued that Cota-Robles fails to teach transforming being adjunct to necessary completion of the request as issued for the I/O operation, since Cota-Robles disclosed that there are to be "zero or more" transformations (i.e. performing zero (no) transformation is not the same as performing a transformation).

55. With respect to this point, examiner respectfully disagreed. According to the MPEP Section 2145 Index X sub-set D, stated *"the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed...."* *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004). Therefore the fact that Cota-Robles's system can perform zero transformation when one is not necessary, does not teach away from performing the transformation when it is necessary. Thus, there is an alternative that at least one transformation is performed. Therefore, it would have been obvious to one of an ordinary skill in the art at the time the invention was made to have recognized that Cota-Robles teaches transforming being adjunct to necessary completion of the request as issued for the I/O operation.

### ***Conclusion***

56. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Neiger et al. (U.S. Patent No. 70359630 teaches virtual machine monitoring.

57. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

58. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer N. To whose telephone number is (571) 272-7212. The examiner can normally be reached on M-T 6AM- 3:30 PM, F 6AM- 2:30 PM.

59. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

60. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Art Unit: 2195

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jennifer N. To  
Examiner  
Art Unit 2195



**SUPERVISORY PATENT EXAMINER**  
JENNIFER N. TO  
ART UNIT 2195